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Form PTO-1390	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER P21273
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) Not Yet Assigned 09/926600
INTERNATIONAL APPLICATION NO. PCT/JP00/03399	INTERNATIONAL FILING DATE 26 May 2000 (26.05.00)	PRIORITY DATE CLAIMED 27 May 1999 (27.05.99)

TITLE OF INVENTION: Cr-BASED ALLOY HAVING AN EXCELLENT STRENGTH-DUCTILITY BALANCE AT HIGH TEMPERATURE

APPLICANT(S) FOR DO/EO/US: Kenji ABIKO

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. X This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ___ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. X This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
4. X The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. X A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. X is attached hereto (required only if not communicated by the International Bureau).
   b. X has been communicated by the International Bureau.
   c. ___ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. X An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).
7. ___ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ___ are attached hereto (required only if not communicated by the International Bureau).
   b. ___ have been communicated by the International Bureau.
   c. ___ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ___ have not been made and will not be made.
8. ___ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))
9. X An oath or declaration of the inventor(s) (35 U.S.C. .371(c)(4)).
   "Executed"
10. X An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (U.S.C. 371(c)(5)).

Items 11 to 16 below concern other document(s) or information included:

11. Assignee: Japan Science and Technology Corporation, of Saitama, Japan
12. ___ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
13. X An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
14. X A FIRST preliminary amendment.
    ___ A SECOND or SUBSEQUENT preliminary amendment.
15. ___ A substitute specification.
16. ___ A change of power of attorney and/or address letter.
17. X Figure of Drawing to be published: 1
18. X Other items or information:
    International Application as published (in Japanese).
    PCT/ISA/210 (in English and Japanese).
    Cover Letter Submitting Amended Pages of Application.
    Article 34 Amendment (6 pages).
    PCT/IPEA/409 International Preliminary Examination Report (in English and Japanese).
    PCT/IB/301.
    PCT/IB/304.
    PCT/IB/308.
    PCT/IB/332.
    PCT/IB/338.
    PCT/RO/101 (in Japanese).
    Claim of Priority.

JC13 Rec'd PCT/PTO 26 NOV 2001

PLICATION NO. (If known, see 37 CFR 1.5) Yet Assigned 09/926600	INTERNATIONAL APPLICATION NO. PCT/JP00/03399	ATTORNEY'S DOCKET NUMBER P21273

9. X The following fees are submitted:

	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Search report has been prepared by the EPO or JPO. . . . . $ 890.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482). . . . . $ 710.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO(37 CFR 1.445(a)(2). . . . . $ 740.00		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO. $1,040.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4). . . . . $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$890.00	
archarge of $130.00 for furnishing the oath or declaration later than ___ 20 ___ 30 onths from the earliest claimed priority date (37 CFR 1.492(e)).	$ 0.00	

Claims	Number Filed	Number Extra	RATE		
tal Claims	6 - 20 =	0	X $18.00	$ 0.00	
dependent Claims	2 - 3 =	0	X $84.00	$ 0.00	
ultiple dependent claim(s) (if applicable)			+ $280.00	$ 0.00	
		TOTAL OF ABOVE CALCULATIONS =		$890.00	
Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				$ 0.00	
		SUBTOTAL =		$890.00	
cessing fee of $130.00 for furnishing the English translation later than ___ 20 ___ 30 nths from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 0.00	
ension of Time fee in the amount of $				$ 0.00	
		TOTAL NATIONAL FEE =		$890.00	
for recording the enclosed assignment (37 CFR 1.21(h). The assignment must be ompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$ 40.00	
		TOTAL FEES ENCLOSED =		$930.00	
				Amount to be refunded	$
				Charged	$

A check in the amount of $ 930.00 to cover the above fees is enclosed.

Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0089.

E: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and ed to restore the application to pending status.

) ALL CORRESPONDENCE TO **CUSTOMER NO. 7055**
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REGISTRATION NUMBER

07055
PATENT TRADEMARK OFFICE

P21273.A01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Kenji ABIKO

Appl. No : Not Yet Assigned
(National Stage of PCT/JP00/03399)

Filed : Concurrently Herewith (International Filing Date May 26, 2000)

For : Cr-BASED ALLOY HAVING AN EXCELLENT STRENGTH-DUCTILITY BALANCE AT HIGH TEMPERATURES

PRELIMINARY AMENDMENT AND COVER LETTER SUBMITTING AMENDED PAGES OF APPLICATION

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Enclosed please find a copy of the International Preliminary Examination Report - Form PCT/IPEA/409 which was drawn on the originally filed description, and claim 1 as filed on May 26, 2000, and includes as an Annex amended pages 1, 3, and 3/1 of the specification and amended page 10 of the claims including claims 1-4.

Based upon the submission of amended sheets of specification and claims, Applicant respectfully requests examination on the merits of the application containing amended pages 1, 3, and 3/1 of the specification and amended page 10 of claims 1-4, in place of originally filed claim 1 appearing on page 10 of the English translation of International Application No. PCT/JP00/03399 as originally filed.

Additionally, prior to the examination of the above-identified application including replacement claims 1-4, amendment of claims 3 and 4 and addition of claims 5 and 6, as follows, is respectfully requested to remove multiple dependent claims.

IN THE CLAIMS

Please amend replacement claims 3 and 4, as follows (a marked-up copy of the claim amendments is provided as an attachment to this Amendment):

3. (Amended-Clean Text) A Cr-based alloy according to claim 1, having a strength-ductility balance of RA×TS $\geq$ 10000 (%• MPa) at higher than 1000°C.

4. (Amended) A Cr-based alloy described in claim 1, having strength-ductility balance of RA×TS $\geq$ 10000 (%• MPa) at 1050°C ~ 1200°C.

Please add new claims 5 and 6 as follows:

---5. A Cr-based alloy according to claim 2, having a strength-ductility balance of RA×TS $\geq$ 10000 (%• MPa) at higher than 1000°C.

6. A Cr-based alloy described in claim 2, having strength-ductility balance of RA×TS $\geq$ 10000 (%• MPa) at 1050°C ~ 1200°C.---

REMARKS

Entry of the foregoing amendment to the claims upon which the International Preliminary Examination Report is based is respectfully requested prior to examination and calculation of the filing fees in the above-identified patent application. Also, claims 3 and 4 have been amended and claims 5 and 6 have been added to delete multiple dependency.

Should there be any questions, the Examiner is invited to contact the undersigned at the below listed number.

Respectfully submitted,
Kenji ABIKO

33,329
Bruce H. Bernstein
Reg. No. 29,027

November 26, 2001
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MARKED-UP COPY OF AMENDED CLAIMS

3. (Amended) A Cr-based alloy according to claim 1 [claims 1 and 2], having a strength-ductility balance of RA×TS ≥ 10000 (%• MPa) at higher than 1000°C.

4. (Amended) A Cr-based alloy described in claim 1 [claims 1 and 2], having strength-ductility balance of RA×TS ≥ 10000 (%• MPa) at 1050°C ~ 1200°C.

SPECIFICATION

Cr-BASED ALLOY HAVING AN EXCELLENT STRENGTH-DUCTILITY BALANCE AT HIGH TEMPERATURE

TECHNICAL FIELD

This invention relates to a Cr-based alloy having an excellent strength-ductility balance at high temperatures (not lower than 1000°C, particularly super-high temperature zone of not lower than 1050°C).

BACKGROUND ART

With the advance of techniques in recent industrial and manufacturing fields and the rise of interest in environmental problem, it is strongly demanded to develop metallic materials having high strength and ductility at higher temperatures, particularly a high temperature zone of not lower than 1000°C.

Incidentally, high-temperature materials used from the old time were mainly Ni-based, Cr-based and Co-based alloys. For example, JP-B-64-7145 proposes Ni-based alloy comprising Cr: 20~35 wt%, Si: 1~8 wt% and C: 1.7~3.5 wt% and forming M_7C_3 type carbide, and also JP-A-55-154542 proposes Ni-Co-Cr based alloy comprising Ni: 20~47 wt%, Co: 6~35 wt%, Cr: 18~36 wt%, C: 0.6~2.5 wt% and Si: 0.5~2.5 wt%. However, all of these alloys could be practically used up to only a temperature of about 500°C. And also, these alloys containing a greater amount of Ni or Co have many problems that the cost of the material itself is very expensive and the thermal expansion coefficient is high.

A Cr-based alloy is hopeful as a high-temperature material being cheaper than Ni- or Co-based alloy and small in the thermal expansion coefficient. For example, JP-A-11-80902 proposes a high-Cr alloy containing C: 0.5~1.5 wt%, Si: 1.0~4.0 wt%, Mn: 0.5~2.0 wt% and Cr: 35~60 wt% and enhancing a resistance to erosion and corrosion at a higher

temperature. However, even in this high-Cr alloy, it is difficult to obtain a sufficient strength at a high temperature zone, particularly above 1000°C. In order to further increase the strength of such a Cr-based alloy, it is required to more increase the Cr amount. In the conventional technique, however, when the Cr amount is not less than 60 mass%, the ductility is substantially lost, so that there is a problem that the working after the production is impossible. Therefore, the alloy containing Cr of not less than 60 mass% has been not yet put into practical use.

As mentioned above, practical materials having a sufficient strength at the high temperature and a good workability (ductility) is not existent in spite of a situation that it is more increased to demand materials durable to use under a super-high temperature environment.

It is, therefore, an object of the invention to solve the above problems of the conventional technique and to provide Cr-based alloys having an excellent strength-ductility balance, which has never been attained in the conventional alloy, at a high temperature above 1000°C, particularly a high temperature above 1050°C.

DISCLOSURE OF INVENTION

The inventors have made various studies in order to solve the above problems by using the Cr-based alloy useful from economical reason and thermal expansion coefficient. As a result, it has been found that even in the Cr-based alloy containing Cr of not less than 60 mass%, the ductility can be provided and the high-temperature strength and ductility can be established by controlling contents of C+N, S and O in the alloy and an amount of an oxide to not more than limiting amounts and the invention has been accomplished.

The invention lies in a Cr-based alloy having an excellent strength-ductility balance at higher temperatures,

comprising Cr: exceeding 60 mass%, C+N: not more than 20 mass ppm, S: not more than 20 mass ppm, O: not more than 100 mass ppm, O as an oxide: not more than 50 mass ppm, and the remainder being Fe and inevitable impurities.

And also, the invention lies in a Cr-based alloy having an excellent strength-ductility balance at higher temperatures, comprising Cr: not less than 65 mass%, C+N: not less than 20 mass ppm, S: not more than 20 mass ppm, O: not more than 100 mass ppm, O as an oxide: not more than 50 mass ppm, and the remainder being Fe and inevitable impurities.

Furthermore, the invention relates to what has a strength-ductility balance of RA×TS ≧ 10000 (%·MPa) at higher than 1000℃ in each above-mentioned invention. And also, the invention relates to what has RA×TS ≧ 10000 (%·MPa) in each above-mentioned invention at 1050℃~1200℃.

BRIEF DESCRIPTION OF DRAWING

Fig. 1 is a graph showing a relation between strength-ductility balance at 1100°C and C+N amount.

BEST MODE FOR CARRYING OUT THE INVENTION

Firstly, there is described an experiment arriving at the invention.

Various Cr-based alloys containing 65 mass% of Cr are produced by changing purities of starting materials and melting conditions and shaped into rod-shaped specimens of 25 mm by hot forging. In this case, hot forging → working → reheating → hot forging are repeated with respect to alloys hardly working into a rod because of poor workability. These rod-shaped specimens are heated to 1250°C and water-cooled, from which round specimens of 6.5 mm in diameter and 120 mm in length are cut out. The strength (tensile strength) and ductility (reduction of cross section) at 1100°C are measured by using these round specimens by means of a high-temperature tensile testing

machine of direct current system (Greeble testing machine).

In Fig. 1 is shown an influence of C+N amount upon strength-ductility balance (product of reduction of cross section RA by tensile strength TS) at a high temperature. From Fig. 1, it is understood that it is required to only decrease the C+N amount but also control S amount and O amount in order to provide RA × TS ≧ 10000 (%·MPa) as a good region of strength-ductility balance at a high temperature zone. The invention is accomplished based on such a knowledge.

The reason why the components according to the invention are restricted to the above ranges is described

below.

·Cr: not less than 60 mass%

Cr is an element required for ensuring the strength at the high temperature. When the amount is less than 60 mass%, it is difficult to ensure the strength above 1000°C, so that it is required to be not less than 60 mass%. Moreover, it is favorable to be not less than 65 mass% in order to develop sufficient properties. And also, the upper limit of Cr amount is not particularly restricted, but 99.99 mass% is critical from a viewpoint of production by melting.

·C+N: not more than 20 mass ppm

C and N form carbonitride of Cr below 1000°C to bring about brittleness of Cr-based alloy and degradation of corrosion resistance. And also, C and N are existent at a solid solution state at a high temperature zone above 1000°C to lower the ductility. In order not to bring about the degradation of these properties, C+N are required to be not more than 20 mass ppm. Moreover, in order to more lessen the degradation of the ductility, C+N are favorable to be not more than 10 mass ppm. Furthermore, the lower limit is not particularly restricted, but it is desirable to be 0.1 mass ppm considering the melt production time in industry.

·S: not more than 20 mass ppm

S exists in form of a sulfide with a slight amount of a metallic element such as Ti, Cu, Mn or the like slightly included in the Cr-based alloy, or segregates in a grain boundary at a solid solution state. In any case, it brings about the degradation of the ductility. Such a degradation of the ductility becomes remarkable when the S amount exceeds 20 mass ppm, so that the upper limit is 20 mass ppm. Moreover, in order to more lessen the degradation of the ductility, it is desirable to control the S amount to not more than 10 mass ppm. And also, the lower limit of the S amount is not particularly restricted,

but it is desirable to be 0.1 mass ppm considering the melt producing cost.

·O (total O): not more than 100 mass ppm, O as an oxide: not more than 50 mass ppm

O forms an oxide with a slight amount of a metallic element such as Al, Si or the like slightly included in the Cr-based alloy to bring about the degradation of the ductility. In order to avoid such a bad influence, it is necessary that the O amount (total O amount) is restricted to not more than 100 mass ppm and the O amount existing as an oxide is controlled to not more than 50 mass ppm. Moreover, in order to maintain the high ductility, it is favorable that the O amount is not more than 50 mass ppm and the O amount as an oxide is not more than 30 mass ppm. The lower limits of the O amount and the O amount as an oxide are not restricted, but they are preferable to be 5 mass ppm and 3 mass ppm, respectively, considering the melt producing cost.

In addition to the aforementioned elements, there are Fe and inevitable impurities. Moreover, the reason why the remaining element is Fe is due to the fact that Cr-Fe alloy is most advantageous from a viewpoint of the ductility and the cost.

The alloy according to the invention has excellent strength and ductility at a high temperature region above 1000°C. Such an alloy can be particularly produced according to usual manner except that starting materials having a higher purity are used and melting conditions are paid attention to. In this case, it is desirable that chromium of not less than 99.9 mass% is used as the starting material and the melting conditions are the use of skull melting process being less in incorporation of impurities from a crucible and the vacuum degree of 10^{-5} Torr.

EXAMPLE

Various Cr-based alloys having a chemical composition as shown in Table 1 are produced by melting. In the melt production, a high purity chromium (purity: 99.95 mass%) and a super-high purity electrolytic iron (purity: 99.998 mass%) are used and a skull melting process using a water-cooled copper crucible is adopted. The resulting ingot is hot forged at 950~1200°C (forging is carried out by repeating hot forging → working → reheating → hot forging at a temperature region more giving a ductility) to form a rod-shaped specimen of 25 mm.

The rod-shaped specimen is heated to 1250°C and water-cooled, from which is cut out a round specimen of 6.5 mm in diameter and 120 mm in length. The ductility (reduction of cross section) at a high temperature is measured with respect to such a specimen by means of a high-temperature tensile testing machine of direct current system (Greeble testing machine). For the comparison, the same test is carried out with respect to 54Ni-18Cr-3Mo alloy (Inconel 718) as a commercial heat-resistant material.

(Table 1)

Alloy	Cr /mass%	C+N /mass ppm	S /mass ppm	O /mass ppm	O as Oxide /mass ppm	Remarks
A	50	0.9	0.6	9	4	Comparative Example
B	50	31	18	17	9	Comparative Example
C	65	1.2	0.9	5	3	Example
D	65	7.5	8.1	20	13	Example
E	65	8.2	7.7	80	40	Example
F	65	25	9.3	80	30	Comparative Example
G	65	9.1	32.2	60	25	Comparative Example
H	65	8.2	7.6	110	70	Comparative Example
I	70	9.1	9.5	31	26	Example
J	80	2.6	3.8	31	22	Example
K	90	5.4	6.2	32	22	Example
L	≧99.9	9.8	7.5	44	29	Example
M	54Ni-18Cr-3.0Mo-18.5Fe		-	-	-	Conventional Example

The measured results of high-temperature tensile test are shown in Table 2. In the alloys A and B containing less than 60 mass% of Cr, the strength at the high temperature lowers. And also, 54Ni-18Cr-3Mo alloy used as a heat-resistant material from the old time violently lowers the ductility above 1000°C and renders RA at 1200°C into 0%.

On the contrary, the invention alloys indicate RA × TS ≧ 10000 (%·MPa) showing a strength-ductility balance at a high temperature above 1000°C and have a very excellent strength-ductility balance.

(Table 2)

Alloy	RA(%)					TS(MPa)					RA×TS (%·MPa)					Remarks
	900°C	1000°C	1050°C	1100°C	1200°C	900°C	1000°C	1050°C	1100°C	1200°C	900°C	1000°C	1050°C	1100°C	1200°C	
A	82	78	81	89	92	195	160	121	100	75	15990	12480	9801	8900	6900	Comparative Example
B	47	62	65	68	72	235	150	120	90	70	11045	9300	7800	6120	5040	Comparative Example
C	79	87	93	98	100	339	243	210	176	131	26781	21141	19379	17248	13100	Example
D	72	85	89	93	95	325	241	205	168	124	23400	20485	18201	15624	11780	Example
E	65	80	84	87	91	291	233	197	160	115	18915	18640	16408	13920	10465	Example
F	58	81	61	62	79	280	210	151	148	112	16240	12810	8211	9178	8848	Comparative Example
G	45	53	54	59	67	276	228	156	152	107	12420	12084	8424	8968	7169	Comparative Example
H	54	62	63	68	72	271	223	150	142	99	14634	13826	9450	9656	7128	Comparative Example
I	72	84	69	93	98	335	242	210	177	128	24120	20328	18541	16461	12544	Example
J	66	82	86	90	96	332	240	210	180	142	21912	19680	18060	16200	13632	Example
K	68	80	85	89	96	331	236	209	182	146	22508	18880	17661	16198	14016	Example
L	69	80	84	87	95	331	238	212	185	150	22839	19040	17660	16095	14260	Example
M	84	86	21	8	0	462	315	264	212	49	38808	27090	5534	1696	0	Conventional Example

INDUSTRIAL APPLICABILITY

As mentioned above, according to the invention, there can be provided Cr-based alloys having an excellent strength-ductility balance at a higher temperature above 1000°C, particularly above 1050°C. Therefore, the invention conduces in various industry fields requiring a high-temperature material and largely contributes to the improvement of earth environment.

CLAIM

1.(Amended) A Cr-based alloy having an excellent strength-ductility balance at higher temperatures, comprising Cr: exceeding 60 mass%, C+N: not more than 20 mass ppm, S: not more than 20 mass ppm, O: not more than 100 mass ppm, O as an oxide: not more than 50 mass ppm, and the remainder being Fe and inevitable impurities.

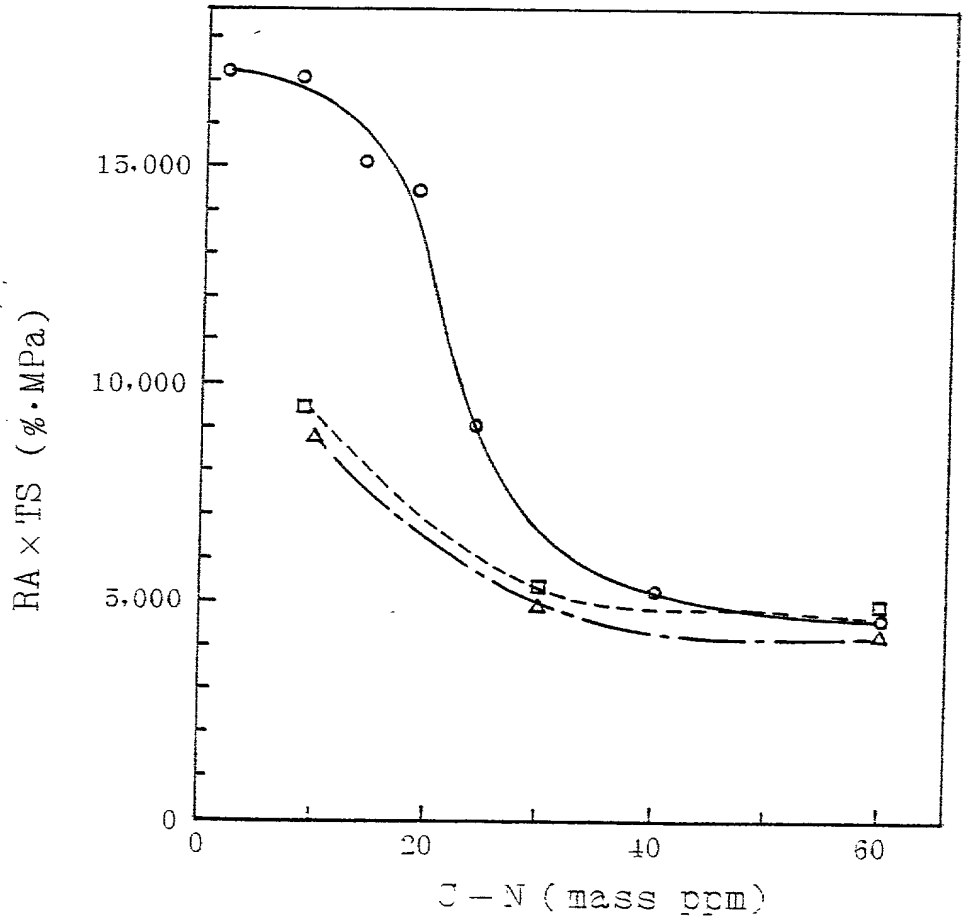
2.(Added) A Cr-based alloy having an excellent strength-ductility balance at higher temperature, comprising Cr: not less than 65 mass%, C+N: not more than 20 mass ppm, S: not more than 20 mass ppm, O not more than 100 mass ppm, O as an oxide: not more than 50 mass ppm, and the remainder being Fe and inevitable impurities.

3.(Added) A Cr-based alloy according to claims 1 and 2, having a strength-ductility balance of $RA \times TS \geqq 10000$ (%·MPa) at higher than 1000 ℃.

4.(Added) A Cr-based alloy described in claims 1 and 2, having strength-ductility balance of $RA \times TS \geqq 10000$ (%·MPa) at 1050℃~1200℃.

Fig.1

	Cr mass %	S mass ppm	O mass ppm	O as Oxide mass ppm
○	65	1.0～5.0	10～ 20	12～ 18
△	65	35～ 40	35～ 45	30～ 40
□	65	5～ 10	120～150	80～100



Docket #: p21273.dc1.doc

Declaration and Power of Attorney for Utility or Design Patent Application
特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明者として、以下のとおり宣言する：

私の住所、郵便の宛先および国籍は、下欄に氏名に続いて記載したとおりであり、

名称の発明に関し、請求の範囲に記載した特許を求める主題の本来の、最初にして唯一の発明者である（一人の氏名のみが下欄に記載されている場合）か、もしくは本来の、最初にして共同の発明者である（複数の氏名が下欄に記載されている場合）と信じ、

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Cr-Based Alloy Having an Excellent Strength-Ductility Balance at High Temperatures

上記発明の明細書（下記の欄で x 印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ ____年____月____日に提出され、米国出願番号 ____ とし、（該当する場合）____年____月____日に訂正されました。又は、

☒ was filed on **26/May/00** as United States Application Number ____ and was amended on ____ (if applicable) or,

特許協定条約国際出願番号 ____ とし、（該当する場合）____年____月____日に訂正されました。

PCT International Application Number **PCT/JP00/03399** and was amended on ____ (if applicable).

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第 37 編第 1 条 56 項に定義されているとおり、特許資格の有無について重要な情報を開示すべき義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

私は、合衆国法典第 35 部第 119 条（a-d）項又は第 365 条(b)項に基づく、下記の外国特許出願又は発明者証出願、或いは第 365 条(a)項に基づく、少なくても米国以外の 1 カ国を指名した PCT 国際出願の外国優先権を主張し、更に優先権の主張に係わる基礎出願の出願日前の出願日を有する外国特許出願、又は発明者証出願或るいは PCT 国際出願を以下に“なし”の箱に印をつけることにより明記する：

I hereby claim foreign priority under Title 35, United States Code §119(a-d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States, listed below. I have also identified below, by checking the "No" box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

Prior foreign applications
先の外国出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	Priority claimed 優先権の主張
11/148326	**Japan**	**27/May/99**	☒ Yes あり ☐ No なし
			☐ Yes あり ☐ No なし

☐ その他の外国特許出願番号は別紙の追補優先権欄にて記載する。

☐ Additional foreign application numbers are listed a supplemental priority sheet attached hereto.

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Japanese Language Utility or Design Patent Application Declaration

私は、合衆国法典第 35 部第 119 条(e)項に基づく、下記の合衆国仮特許出願の利益を主張する。

I hereby claim the benefit under Title 35, United States Code §119 (e) of any United States provisional application(s) listed below.

(Application No.) （出願番号）	(Day/Month/Year Filed) （出願の年月日）
(Application No.) （出願番号）	(Day/Month/Year Filed) （出願の年月日）
(Application No.) （出願番号）	(Day/Month/Year Filed) （出願の年月日）

☐ その他の合衆国仮特許出願番号は別紙の追補優先権欄にて記載する。

☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

私は、合衆国法典第 35 部第 120 条に基づく下記の合衆国特許出願、又は第 365 条(c)項に基づく合衆国を指名した PCT 国際出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第 35 部第 112 条第 1 項規定の態様で、先の合衆国特許出願又は PCT 国際出願に開示されていない限度において、先の出願の出願日と本願の国内出願日又は PCT 国際出願日の間に有効となった連邦規則法典第 37 部第 1 章第 56 条に記載の特許要件に所要の情報を開示すべき義務を有することを認める。

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application No.) （出願番号）	(Day/Month/Year Filed) （出願の年月日）	(Status) （特許済み、係属中　放棄済み）
(Application No.) （出願番号）	(Day/Month/Year Filed) （出願の年月日）	(Status) （特許済み、係属中　放棄済み）

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☐ Additional U.S. or international application numbers are listed on a supplemental priority sheet attached hereto.

私は、ここに自己のに知識に基づいて行った陳述が全て真実であり、自己の有する情報および信ずるところに従って行った陳述が真実であると信じ、さらに故意に虚偽の陳述等を行った場合、合衆国法典第 18 部第 1001 条により、罰金もしくは禁　に処せられるか、またはこれらの刑が併科され、またかかる故意による虚偽による陳述が本願ないし本願に対して付与される特許の有効性を損なうことがあることを認識して、以上の陳述を行ったことを宣言する。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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委任状： 私は、下記発明者として、下記に明記された顧客番号を伴う以下の弁護士又は、代理人をここに選任し、本順の手続きを遂行すること並びにこれに関する一切の行為を特許商標庁に対して行うことを委任する。そして全ての通信はこの顧客番号宛に発送される。

顧客番号 7055

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（第三またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。）

(Supply similar information and signature for third and subsequent joint inventors.)